4 Affected Environment, Environmental Consequences, and Mitigation

4.3 Pedestrian and Bicycle Facilities

4.3.1 Introduction

This section assesses the potential construction and operational effects of the No Build Alternative and Build Alternative on existing pedestrian and bicycle transportation facilities and identifies mitigation measures that will be implemented to avoid or minimize any potential adverse effects to these resources. This assessment specifically focuses on the effects of the alternatives on pedestrian and bicycle safety, accessibility, connectivity, and opportunities for future local and regional multimodal connections.

This section also assesses the consistency of the alternatives with federal, state, and municipal plans, policies, and guidelines related to pedestrian and bicycle transportation facilities.

4.3.1.1 Resource Definition

Pedestrian facilities include sidewalks, crosswalks, curb ramps, walkways, paths, and trails that are exclusively for pedestrians in the public right-of-way. Bicycle facilities include a portion of roadway, shoulder, or public right-of-way that has been designated for preferential or exclusive use by bicyclists by pavement markings and/or signage. Bicycle facilities also include bike-share facilities and bicycle parking areas. Pedestrian and bicycle facilities also include off-road shared-use or multi-use facilities commonly used by pedestrians, bicyclists, and other nonmotorized users. In this section, a shared-use path (SUP) refers to infrastructure where pedestrians and bicyclists share the same path of travel, whereas a shared-use facility refers to infrastructure that provides separated space for both pedestrians and bicyclists.

4.3.1.2 Regulatory Context

Bicycle and pedestrian needs must be given due consideration in developing and implementing federal aid transportation projects under federal surface transportation law.[1] The Americans with Disabilities Act (ADA),[2] and Section 504 of the Rehabilitation Act of 1973 require that new construction and alteration of pedestrian facilities be accessible to persons with disabilities.[3]

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[1] 23 United States Code (USC) Section 217: Bicycle transportation and pedestrian walkways. https://uscode.house.gov/view.xhtml?req=granuleid:USC-2010-title23-section217&num=0&edition=2010

[2] 42 USC Sections 12131 through 12164. https://www.ada.gov/

[3] 29 USC Section 794. https://www.hhs.gov/civil-rights/for-individuals/disability/section-504-rehabilitation-act-of-1973/index.html

Policy statements, design guidelines, and regulations that apply to pedestrian and bicycle transportation facilities include the following:

- U.S. Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations[4]
- FHWA Technical Advisory T 6640.8A[5]
- FHWA Bikeway Selection Guide[6]
- Massachusetts Department of Transportation (MassDOT) Engineering Directive E-20-001[7]
- MassDOT Project Development and Highway Design Guide[8]
- MassDOT Separated Bike Lane Planning and Design Guide[9]
- MassDOT Healthy Transportation Policy[10]
- U.S. Access Board's Public Right-of-Way Accessibility Guidelines[11]
- Statewide Bicycle Transportation Plan[12]
- Statewide Pedestrian Transportation Plan[13]

4.3.1.3 Methodology and Study Area

MassDOT obtained mapping and information for existing pedestrian and bicycle transportation facilities through site visits (November 2024) and geographic information systems databases, including MassMapper, Massachusetts GeoDOT Open Data Portal, as well as internet-based sources such as Google Maps. MassDOT identified information on future planned pedestrian and bicycle transportation facilities by reviewing the following:

- Cape Cod 2024 Regional Transportation Plan[14]

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[4] https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm?_gl=1*eiuu5u*_ga*MTQ5MTA0MDQ3Ny4xNzM4NzY0Mjk0*_ga_VW1SFWJKBB*MTczODc2NDI5My4xLjAuMTczODc2NDMwMi4wLjAuMA

[5] https://www.environment.fhwa.dot.gov/legislation/nepa/guidance_preparing_env_documents.aspx

[6] https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf

[7] https://www.mass.gov/doc/controlling-criteria-and-design-justification-process-for-massdot-highway-division-projects-e/download

[8] https://www.mass.gov/manual/massdot-project-development-and-design-guide

[9] https://www.mass.gov/lists/separated-bike-lane-planning-design-guide

[10] https://www.mass.gov/doc/healthy-transportation-policy-directive/download

[11] https://www.access-board.gov/prowag/technical.html

[12] https://www.mass.gov/info-details/bicycle-plan

[13] https://www.mass.gov/info-details/pedestrian-plan

[14] https://www.capecodcommission.org/our-work/rtp/

- Cape Cod Metropolitan Planning Organization Federal Fiscal Year 2024-2028 Transportation Improvement Program[15]
- Town of Bourne Local Comprehensive Plan[16]

The Study Areas for this assessment include areas within 500 feet of the Project Limits of the Build Alternative at Sagamore Bridge and Bourne Bridge.

4.3.2 Affected Environment

Gaps and unsafe conditions exist in pedestrian and bicycle access across Cape Cod Canal via Sagamore Bridge and Bourne Bridge and between adjacent roadways. There is also a lack of pedestrian and bicycle access to surrounding shared-use facilities within the Study Areas. Many roadways in the Study Areas include a sidewalk on one side of the road. Many sidewalks are discontinuous, noncompliant with ADA standards, or in need of repair. The following sections describe existing pedestrian and bicycle transportation facilities within the Study Areas, with additional details provided for each of the following Study Area quadrants: Sagamore North, Sagamore South, Bourne North, and Bourne South. Discussion of planned pedestrian and bicycle facilities is also presented.

4.3.2.1 Existing Pedestrian and Bicycle Facility Network

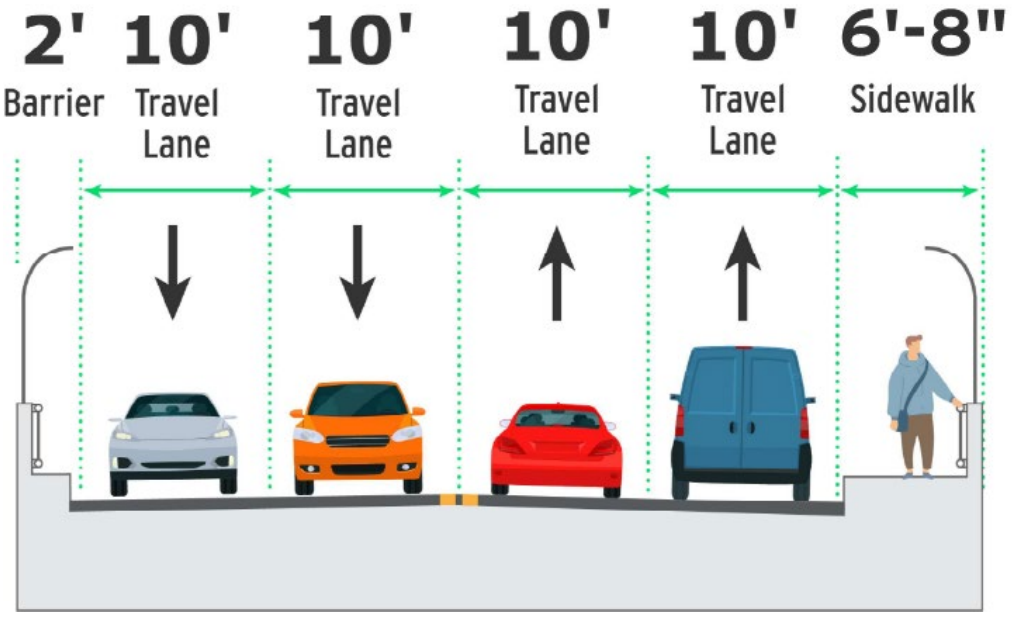
Sagamore Bridge and Bourne Bridge

Sagamore Bridge and Bourne Bridge provide the only roadway connections for vehicles and pedestrians across Cape Cod Canal. Each bridge provides a narrow, raised, 6-foot, 8-inch-wide sidewalk along one side that includes steep grades of up to 6%, which are noncompliant with ADA standards. There are no dedicated accommodations for bicycle travel on the bridges. The lack of shoulders and physical barrier separation between the sidewalks and vehicle traffic lanes on the bridges presents safety risks and discomfort for pedestrians due to the proximity of moving motor vehicles. **Figure 4.3-1** provides a representative cross-section of the existing bridges.

[15] https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/tr/Transportation%20Plans/TIP/FY2024-2028%20TIP/Endorsement%20Files/Cape_Cod_2024-2028_Transportation_Improvement_Program%20Endorsed%20May%202023.pdf

[16] https://www.townofbourne.com/sites/g/files/vyhlif12841/f/news/2019_final_revision_comprehensive_version_12.5.19.pdf

Figure 4.3-1. Representative Existing Bridge Cross-Section



Source: Massachusetts Department of Transportation, 2024

For safety reasons, limited-access highways within the Study Areas—State Route 3 and U.S. Route 6 approaching Sagamore Bridge, and State Route 25 approaching Bourne Bridge (north of Cape Cod Canal)—prohibit pedestrian access and do not provide sidewalks. Bicycle access is also prohibited along these limited-access highways.

Cape Cod Canal Service Roads

Within the Study Areas, the Cape Cod Canal Service Roads run along the north and south sides of Cape Cod Canal. The U.S. Army Corps of Engineers (USACE) owns and maintains these service roads as navigational support for the Cape Cod Canal Federal Navigation Project. The North Service Road on the canal is approximately 7 miles long, while the South Service Road is approximately 6.5 miles long. While the purpose of these service roads is primarily for navigation support, they are also popular resources for cycling, walking, and jogging. As illustrated in **Figure 4.3-2**, public access to the Canal Service Roads is provided from three points in the Study Areas:

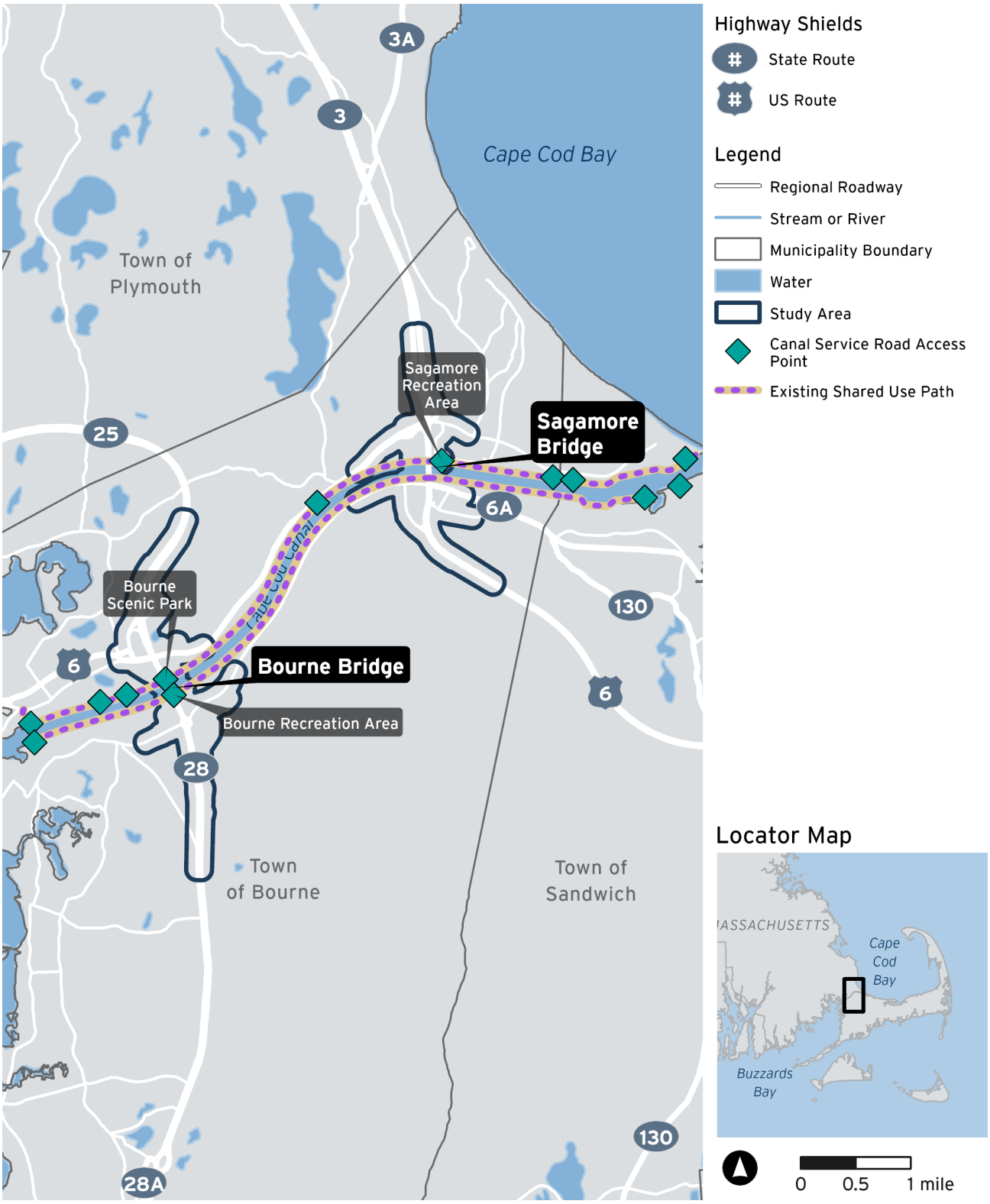
- North of Cape Cod Canal
  - Sagamore Recreation Area
  - Bourne Scenic Park
- South of Cape Cod Canal
  - Bourne Recreation Area

Regional Bicycle and Pedestrian Routes

Within the Study Areas, there are two regional bicycle and pedestrian routes (refer to **Figure 4.3-3** illustrating segments of these routes):

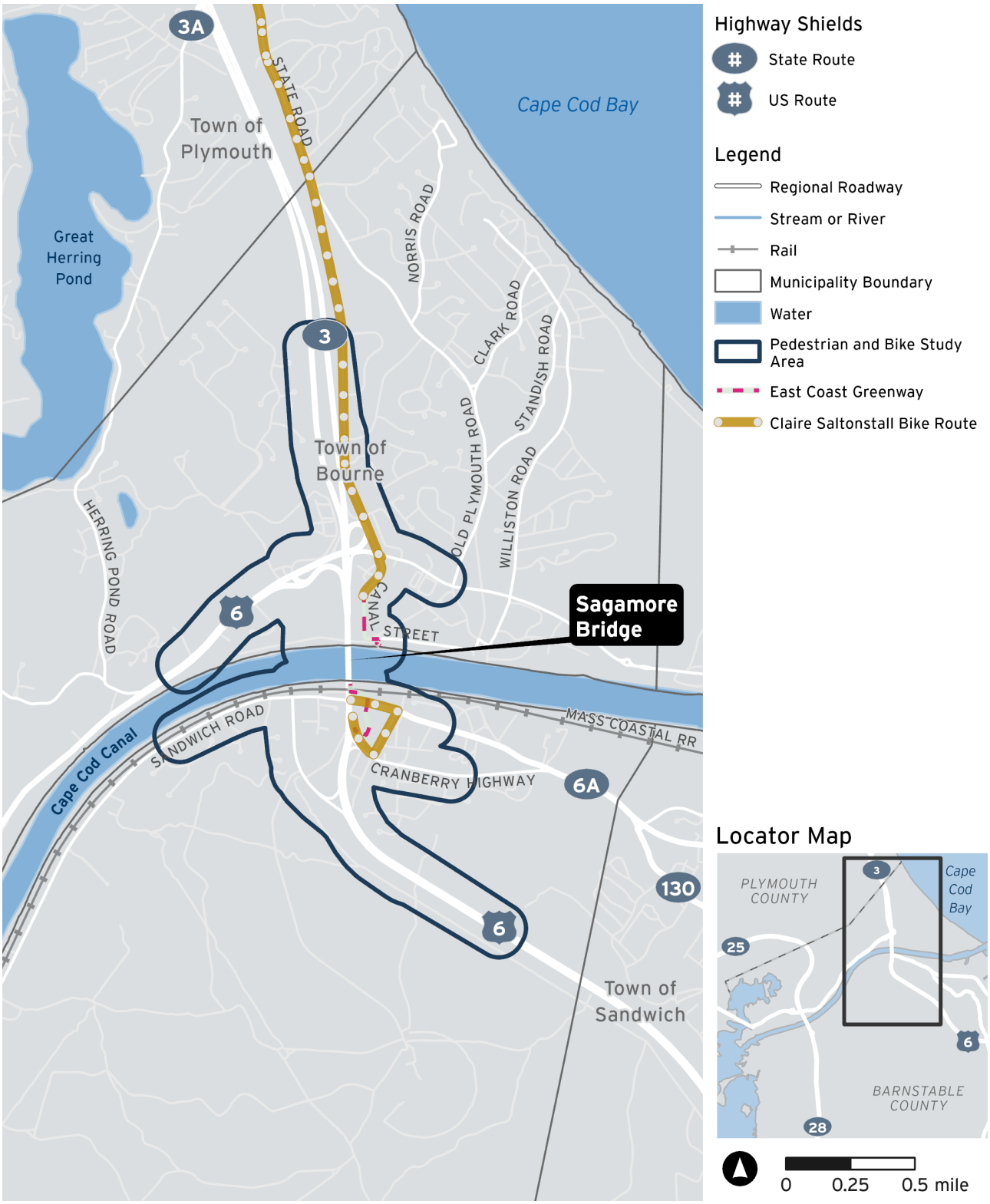
- The Claire Saltonstall Memorial Bikeway is a series of bike paths and on-street routes that travel from the Charles River Bike Path in Boston to Provincetown and Woods Hole in Cape Cod.
- The East Coast Greenway is a 3,000-mile-long pedestrian and bicycle route between Maine and Florida along the East Coast of the United States.

Figure 4.3-2. Canal Service Road Public Access Points



Source: Massachusetts Department of Transportation, 2024

Figure 4.3-3. Regional Bikeways (Sagamore Bridge Study Area)



Source: Massachusetts Department of Transportation, 2024

Sagamore North Quadrant

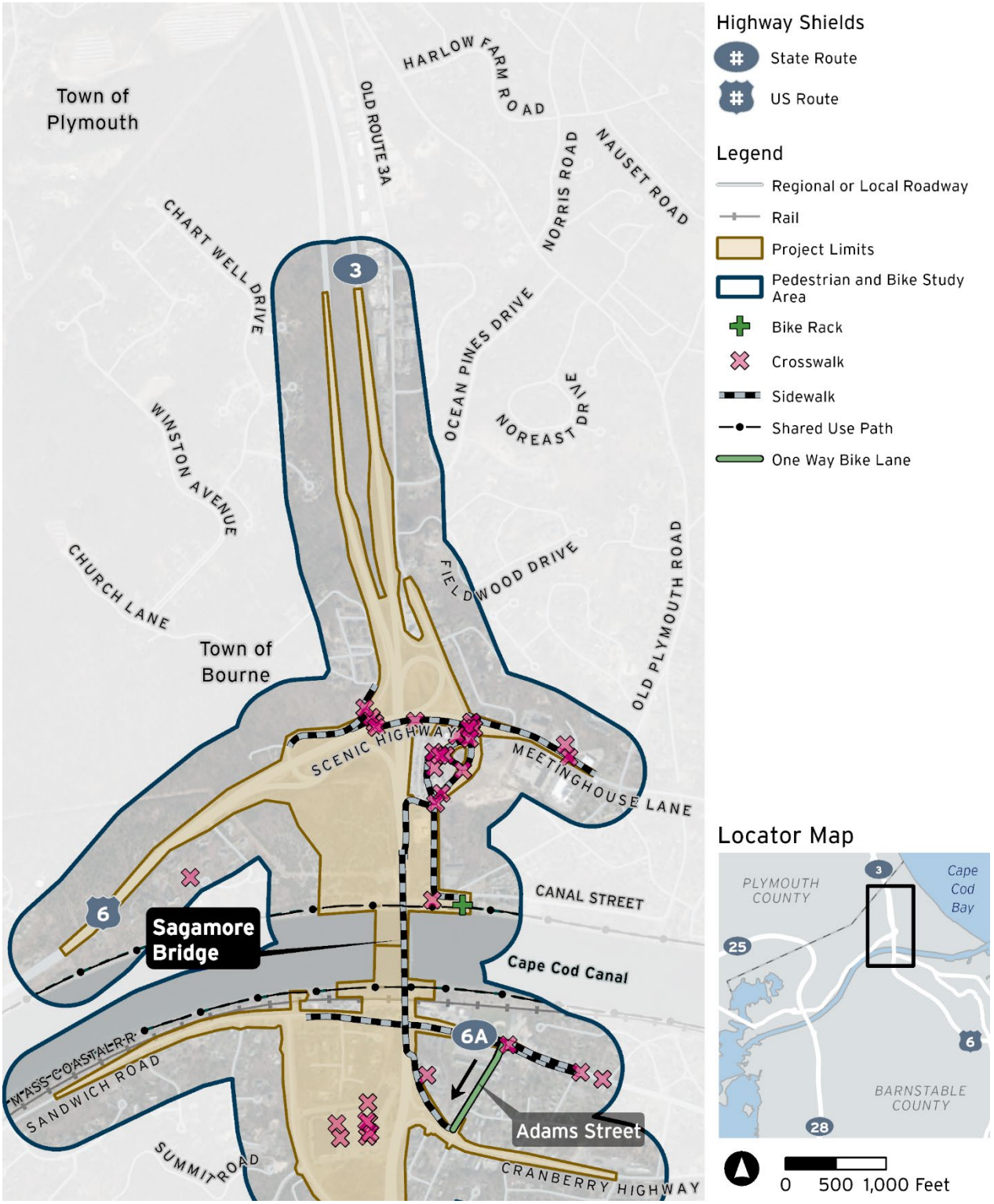
North of Cape Cod Canal, the Sagamore Bridge walkway provides pedestrian access to the sidewalk along the east side of Sagamore Bridge at the southern end of the Bourne Park and Ride Lot. **Exhibit 4.3-1** depicts the Sagamore Bridge sidewalk.

Exhibit 4.3-1. Walkway Leading to Sagamore Bridge

Source: Massachusetts Department of Transportation, 2024

As illustrated in **Figure 4.3-4**, there are missing links or gaps in the network of bicycle and pedestrian facilities from Sagamore Bridge to surrounding neighborhoods south of Scenic Highway and east of State Road (Old Route 3A). There is also a lack of pedestrian and bicycle connectivity to Canal Service Road west of the Sagamore Bridge approach. Apart from the shared use of the Canal Service Road, there is a lack of off-road shared-use facilities in the Sagamore North quadrant.

Figure 4.3-4. Existing Pedestrian and Shared-Use Facilities (Sagamore North Quadrant)



Source: Massachusetts Department of Transportation, 2024

Sagamore South Quadrant

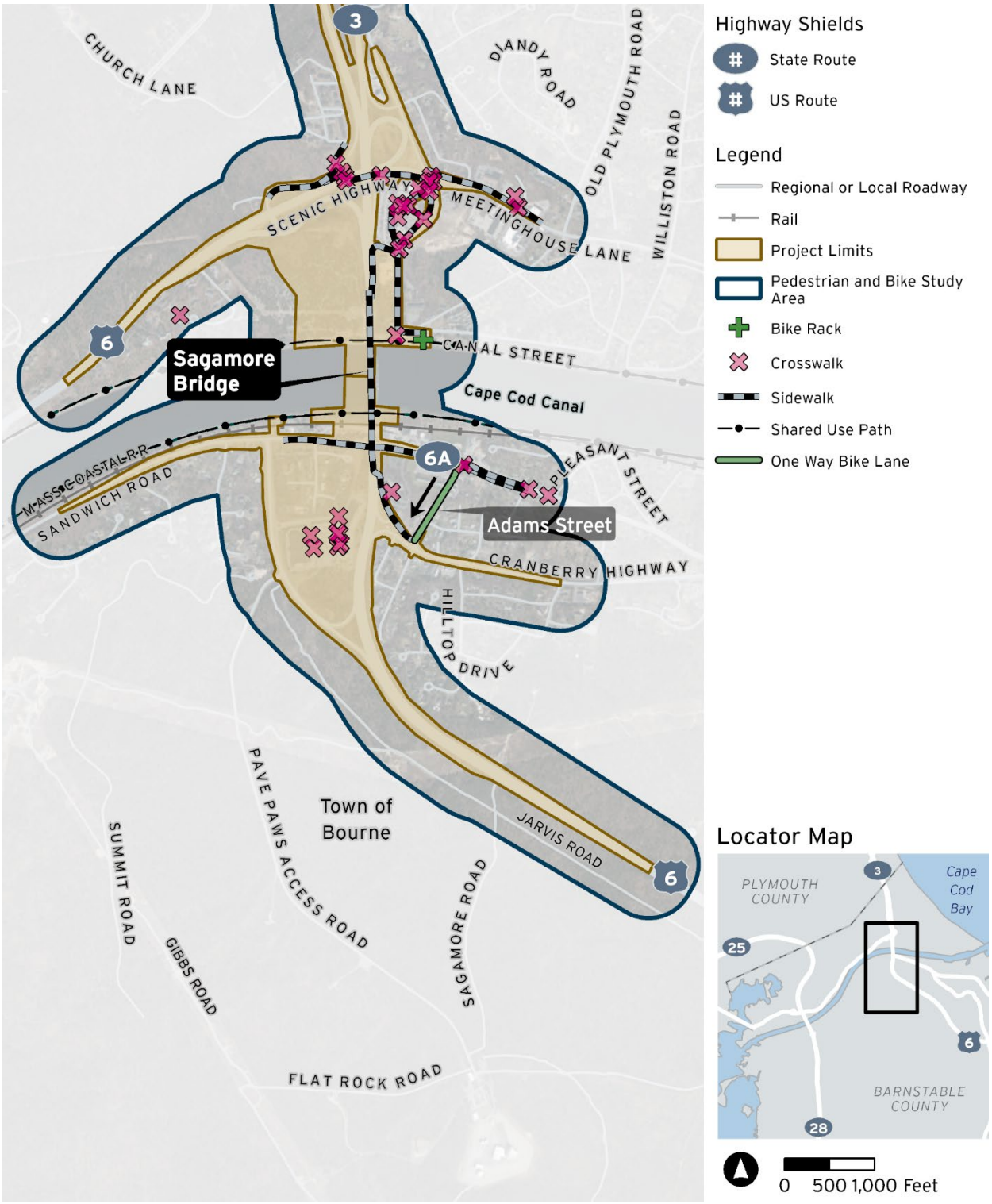
The sidewalk along the east side of Sagamore Bridge ends immediately south of the bridge at a driveway near the windmill at the former Christmas Tree Shops store in Bourne (5 Cranberry Highway). **Exhibit 4.3-2** depicts the Sagamore Bridge sidewalk terminus south of Cape Cod Canal.

Exhibit 4.3-2. Sagamore Bridge Sidewalk Terminus at Cul-de-Sac (5 Cranberry Highway)

Source: Massachusetts Department of Transportation, 2024

As illustrated in **Figure 4.3-5**, there are missing links or gaps in the network of bicycle and pedestrian facilities from Sagamore Bridge to surrounding neighborhoods north and south of Sandwich Road and Cranberry Highway. There is also a lack of pedestrian and bicycle connectivity from surrounding neighborhoods to the shared-use Canal Service Road and to Factory Outlet Way, which provides access to a commercial complex, including the Market Basket grocery store and other retail businesses. There is a one-way, marked, on-road bicycle lane along the east side of Adams Street from Sandwich Road ending near its intersection with Cranberry Highway. This marked on-road bicycle lane on Adams Street is part of the Claire Saltonstall Memorial Bikeway (**Figure 4.3-5**). Apart from the shared use of Canal Service Road, there is a lack of off-road shared-use facilities in the Sagamore North quadrant.

Figure 4.3-5. Existing Pedestrian and Shared-Use Facilities (Sagamore South Quadrant)



Source: Massachusetts Department of Transportation, 2024

Bourne North Quadrant

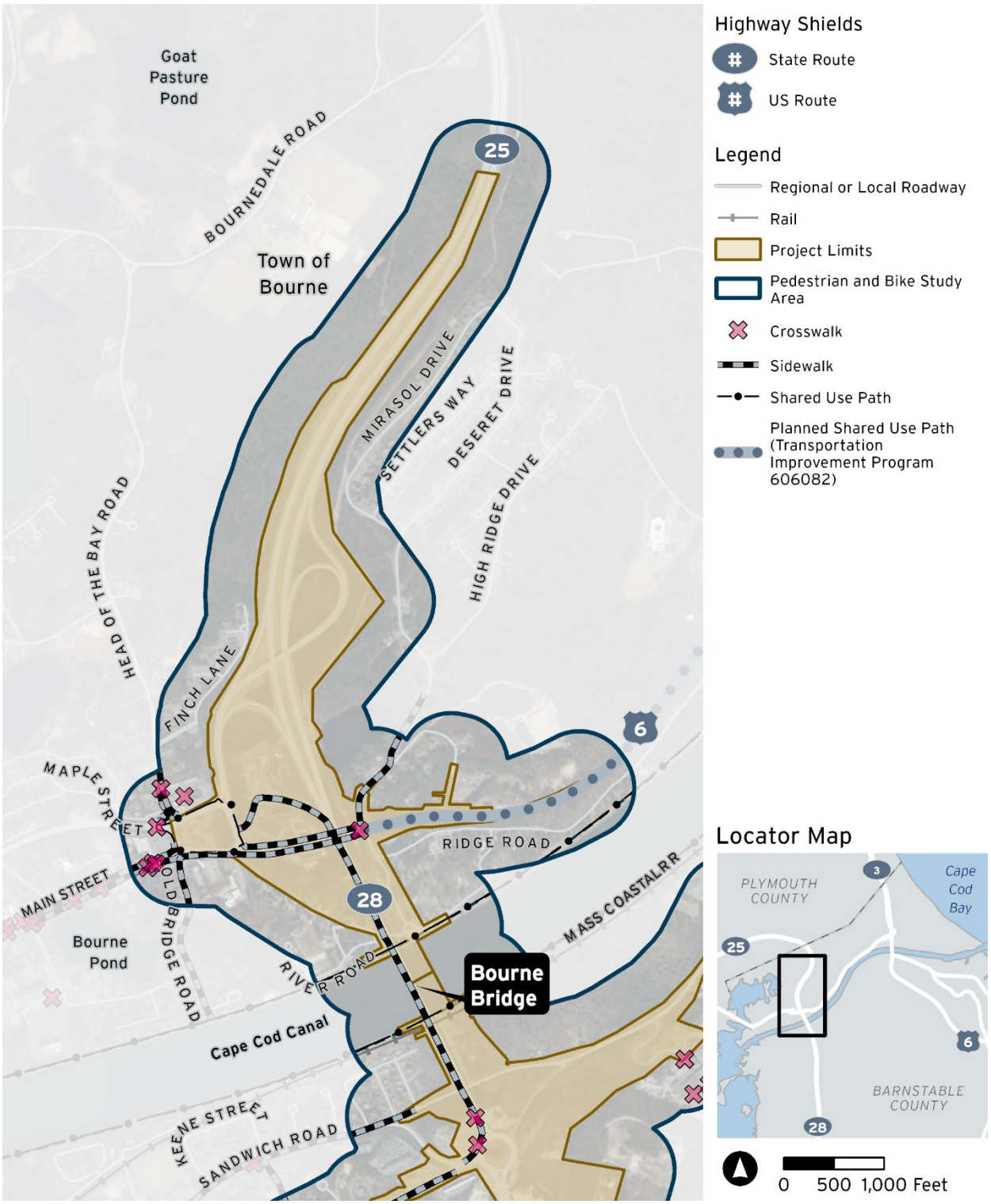
North of Cape Cod Canal, a narrow, paved walkway from the cul-de-sac at Old Bourne Bridge approach provides pedestrian access to the sidewalk along the west side of Bourne Bridge. **Exhibit 4.3-3** depicts the paved walkway connection from Old Bourne Bridge approach leading to Bourne Bridge.

Exhibit 4.3-3. Paved Walkway Leading to Bourne Bridge

Source: Massachusetts Department of Transportation, 2024

In 2023, MassDOT completed traffic and multimodal improvements at Belmont Circle under MassDOT Project File No. 606900. This project installed sidewalks and a SUP along the outer perimeter of the circle, with connections to sidewalks along the roadway approaches to the circle including Scenic Highway, Old Bridge Road, Main Street, Buzzards Bay Bypass, Head of the Bay Road, and Bourne Bridge approach, which provides pedestrian access to Bourne Bridge. In 2025, MassDOT plans to construct a SUP on the south side of Scenic Highway under Project File No. 606082 that would run west to east from the intersections at Nightingale Road/Andy Oliva Drive to Edgehill Road. The western terminus of the planned SUP under MassDOT Project File No. 606082 will be within the Bourne North quadrant. **Figure 4.3-6** depicts existing and planned pedestrian and bicycle facilities within the Bourne North quadrant.

Figure 4.3-6. Existing and Planned Pedestrian and Shared-Use Facilities (Bourne North Quadrant)



Source: Massachusetts Department of Transportation, 2024

Bourne South Quadrant

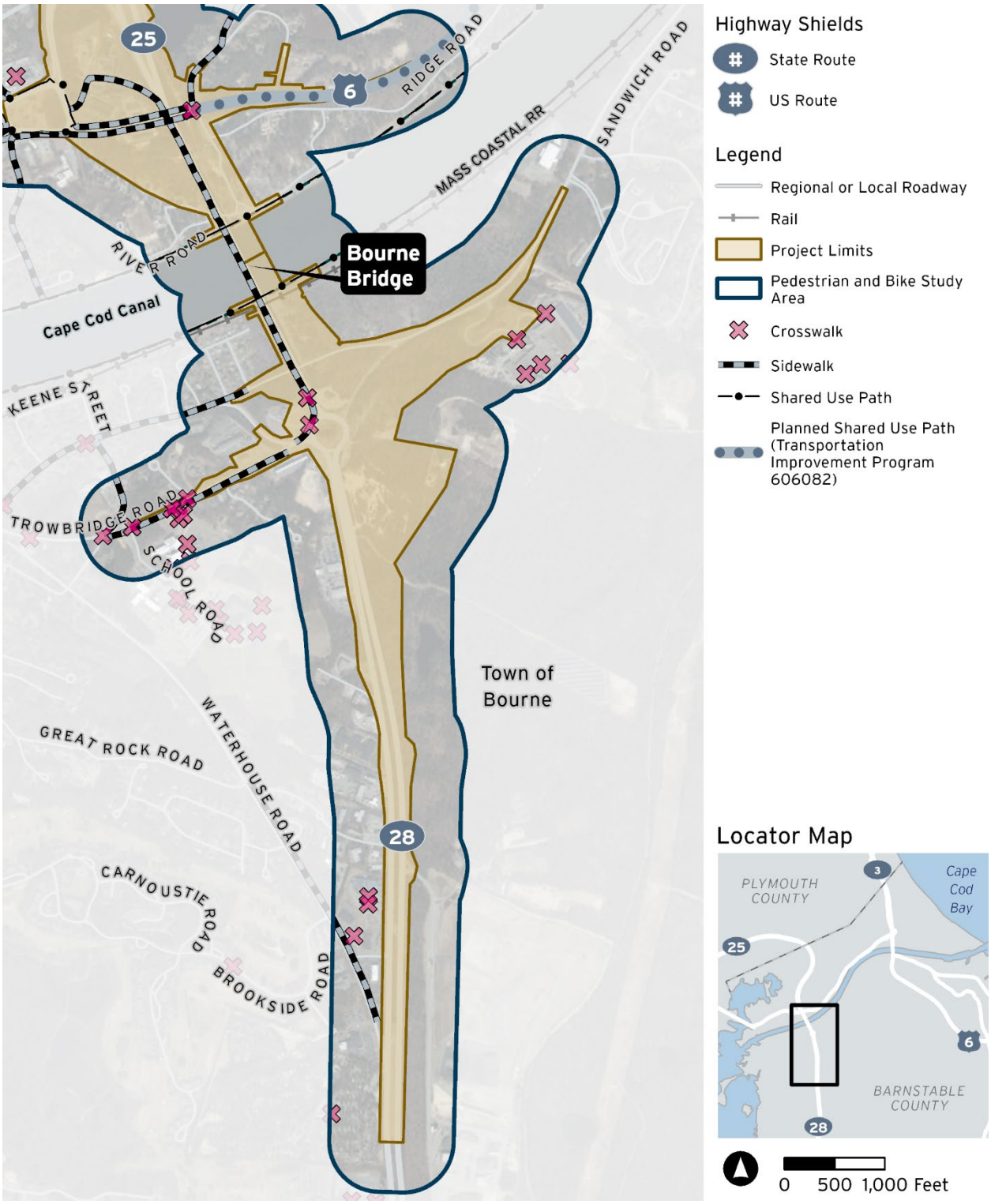
The sidewalk along the west side of Bourne Bridge ties into a short section of a SUP that continues through the northwest quadrant of Bourne Rotary to the second driveway of the District 7 State Police barracks, where it ends near the intersection at Veterans Way and Trowbridge Road. **Exhibit 4.3-4** depicts the SUP terminus from the Bourne Bridge sidewalk near the intersection at Veterans Way and Trowbridge Road. There is no crosswalk at this intersection to facilitate pedestrian crossing to the sidewalk on Trowbridge Road, which leads to the Bourne Intermediate, Middle, and High Schools.

Exhibit 4.3-4. Shared-Use Path Terminus at District 7 State Police Barracks Driveway

Source: Massachusetts Department of Transportation, 2024

As illustrated in **Figure 4.3-7**, there are gaps in the network of pedestrian facilities from Bourne Bridge to neighborhoods along Sandwich Road and Trowbridge Road, and to the Upper Cape Cod Regional Technical High School at 220 Sandwich Road. Apart from the shared use of the Canal Service Road and the short section of the SUP in the northwest quadrant of the Bourne Rotary that ties into the sidewalk on Bourne Bridge, there is a lack of off-road shared-use facilities in the Bourne South quadrant.

Figure 4.3-7. Existing Pedestrian and Shared-Use Facilities (Bourne South Quadrant)



Source: Massachusetts Department of Transportation, 2024

Pedestrian and Bicycle Crash Records

High traffic volumes, narrow roadways, and gaps in the pedestrian and bicycle network within the Study Areas pose risks to pedestrian and bicyclist safety. According to pedestrian and bicycle crash records from 2018 to 2023, there were four reported incidents of vehicular collisions with pedestrians within the Sagamore Bridge Study Area. **Table 4.3-1** provides details of the reported vehicle-pedestrian crashes within the Project Limits in the Sagamore Bridge Study Area. Based on available crash records from 2018 to 2023, there were no reported incidents of vehicular collisions with cyclists in the Sagamore Bridge Study Area during this period. **Figure 4.3-8** illustrates the map IDs in **Table 4.3-1** that correspond to pedestrian crash locations within the Project Limits in the Sagamore Bridge Study Area.

Table 4.3-1. Vehicle-Pedestrian Crashes, 2018 to 2023 (Sagamore Bridge Study Area)

Map ID	Street Address	Severity	Vehicle Maneuver
24	Commerce Way (near Sagamore Park and Ride Lot)	Nonfatal injury	Backing up
25	778 Sandwich Road (near the intersection with the Mid-Cape Connector)	No apparent injury	Turning left
26	1 Factory Outlet Way at Market Basket Parking Lot	Nonfatal injury	Backing up
27	880 Sandwich Road (near the intersection with Adams Street)	Suspected serious injury	Traveling straight ahead

Source: Massachusetts Department of Transportation, 2024

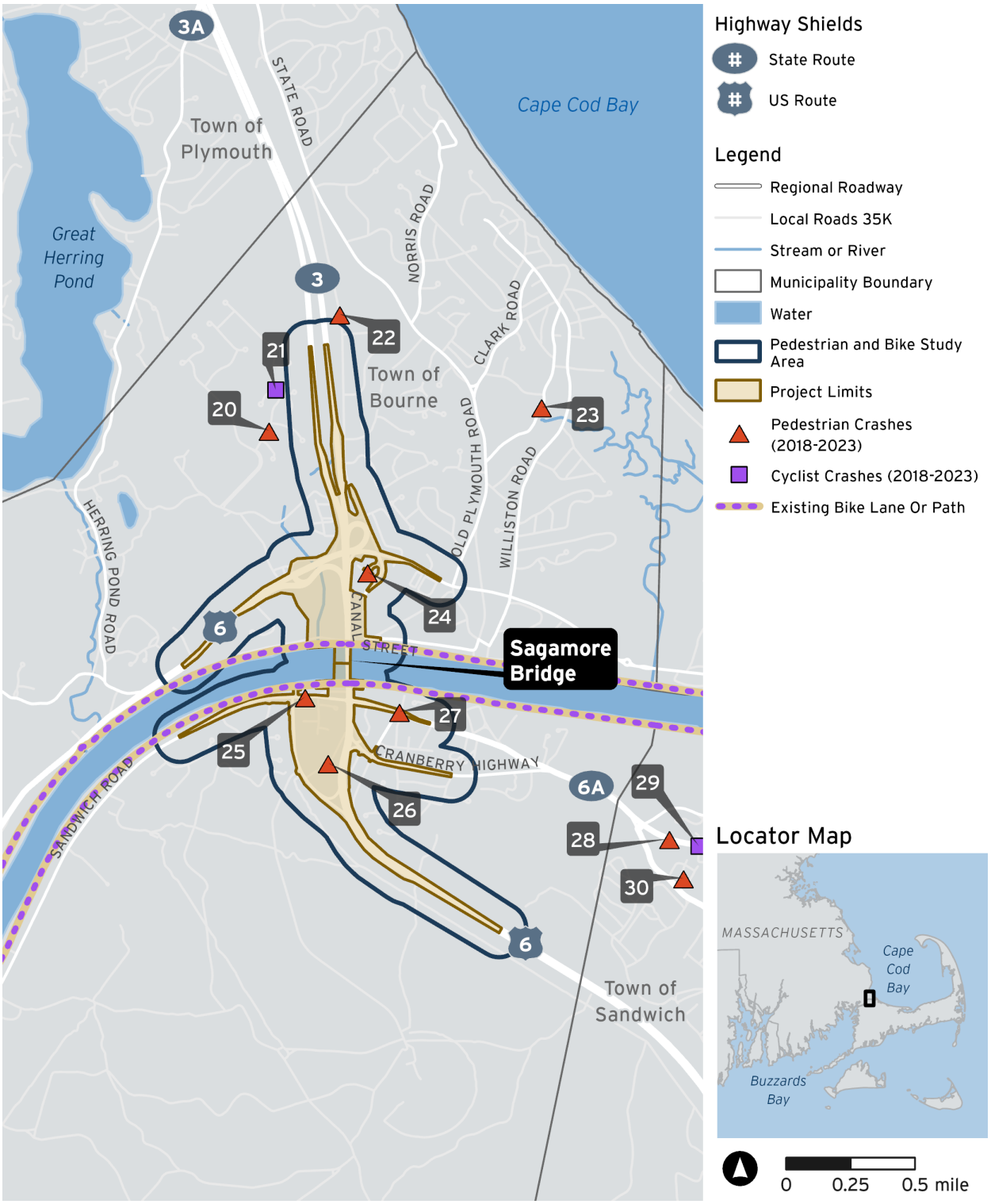
According to pedestrian and bicycle crash records from 2018 to 2023, there were four reported incidents of vehicle collisions with pedestrians and bicyclists from 2018 to 2023, which are listed in **Table 4.3-2**. **Figure 4.3-9** illustrates the map IDs in **Table 4.3-2** that correspond to pedestrian and bicyclist crash locations within the Project Limits in the Bourne Bridge Study Area.

Table 4.3-2. Vehicle-Pedestrian and Bicyclist Crashes, 2018 to 2023 (Bourne Bridge Study Area)

Map ID	Street Address	Severity	Vehicle Maneuver
11	East Rotary Route/Route 25 On-Ramp Route	Nonfatal injury	Vehicle traveling straight ahead
13	370 Scenic Highway (near Andy Oliva Drive intersection at Bourne Scenic Park)	Nonfatal injury	Sideswipe with bicyclist
14	105 Trowbridge Road (near Cape Side Convenience store)	Suspected serious injury	Slowing or stopped in traffic; vehicle traveling straight
15	290 McArthur Boulevard (near Harbor Hill Drive)	Suspected serious injury	Angle crash with bicyclist in shoulder

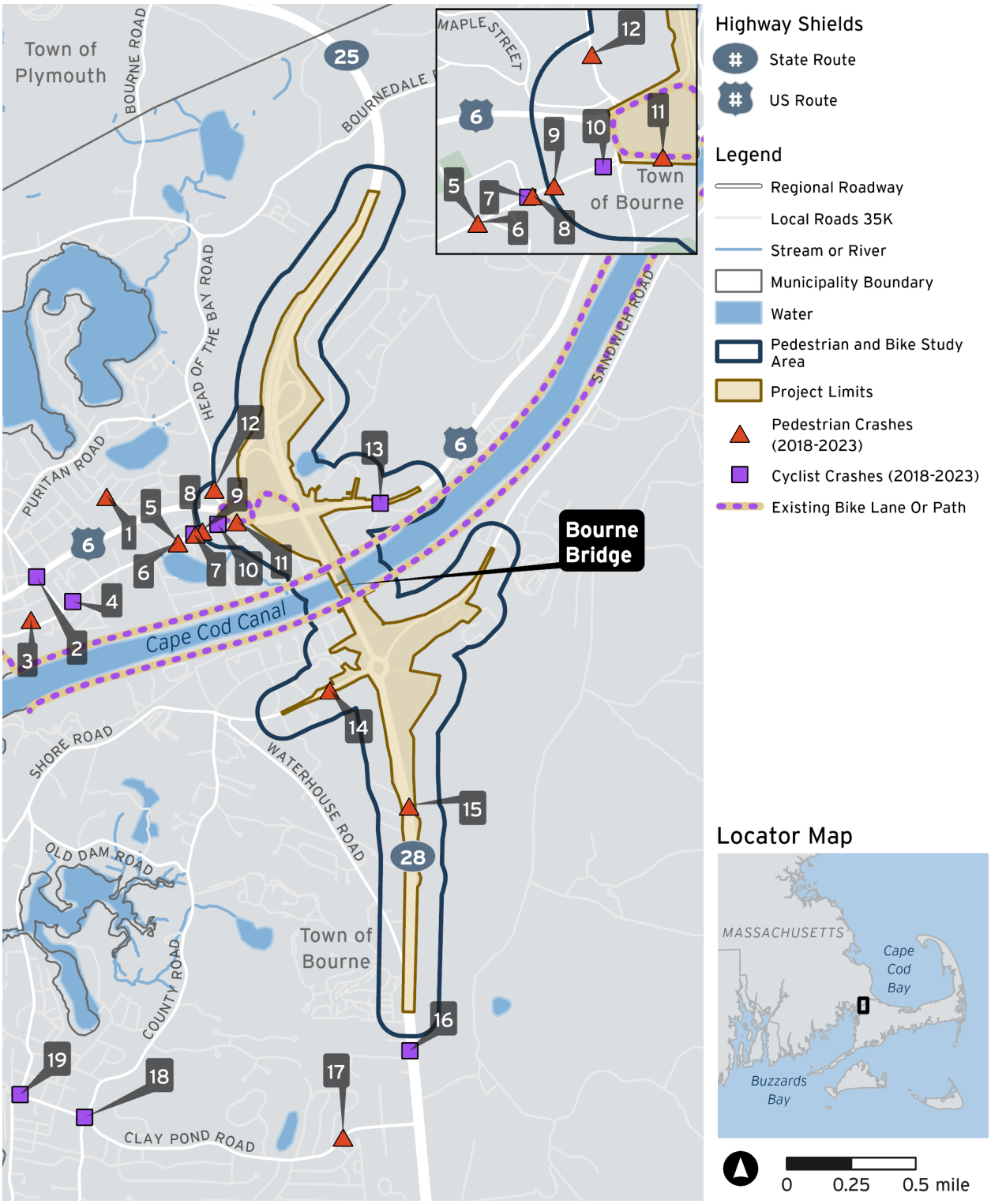
Source: Massachusetts Department of Transportation, 2024

Figure 4.3-8. Vehicle-Pedestrian and Bicyclist Crashes, 2018 to 2023 (Sagamore Bridge Study Area)



Source: Massachusetts Department of Transportation, 2024

Figure 4.3-9. Pedestrian and Bicyclist Crashes, 2018–2023 (Bourne Bridge Study Area)



Source: Massachusetts Department of Transportation, 2024

4.3.3 No Build Alternative

The No Build Alternative would involve continual maintenance and repairs to Sagamore Bridge and Bourne Bridge and their approaches to ensure the safety of the traveling public.

While recently completed and proposed transportation improvement projects on the Transportation Improvement Program (**Chapter 3, Table 3-2**) would improve conditions and expand opportunities for bicycling and walking on Cape Cod, the No Build Alternative would result in continued limitations to pedestrian and bicycle safety and mobility due to geometric and multimodal deficiencies of Sagamore Bridge and Bourne Bridge, which provide the only roadway access points to and from Cape Cod.

The No Build Alternative would not improve pedestrian and bicycle accommodations, mobility, or accessibility across Cape Cod Canal, which fails to satisfy the Cape Cod Bridges Program's purpose and need. Without improvements to pedestrian and bicycle accommodations across the bridges and connections to the local roadway network, the No Build Alternative would fail to satisfy the goals of the Statewide Bicycle and Statewide Pedestrian Transportation Plans, which seek to make walking and biking safe, comfortable, and convenient options for short trips.

4.3.4 Build Alternative

Under the Build Alternative, each replacement bridge would provide designated pedestrian and bicycle infrastructure separated from vehicular traffic. At minimum, there would be 14 feet of separation due to a 12-foot highway shoulder and a 2-foot concrete barrier and at maximum, the separation would exceed 20 feet at the network tied arch. Because Sagamore Bridge and Bourne Bridge serve high traffic volumes (more than 6,000 vehicles per day) with vehicle speeds exceeding 35 mph, separated facilities for bicycle and pedestrian users are proposed to reduce potential conflicts with vehicles.[17] The replacement bridges would provide a 20-foot-wide cross-section for pedestrians and bicyclists along the approach spans. The 20-foot-wide structure width would vary in effective width[18] over the main span.

The cross-section design evaluated the most efficient use of the available width to accommodate the comfort level of the anticipated users and the safety of each mode. The maximum longitudinal grade for all shared-use facilities, including bridge profiles, is 4.5% to meet ADA requirements of 5.0%. According to the AASHTO Guidelines,[19] separation is recommended for facilities that anticipate large speed differentials between users. Because the bridge profiles sustain long stretches of 4.0% (Sagamore Bridge) and 4.5% (Bourne Bridge) downgrades on the approaches, increased speeds of 30 mph are anticipated for bicyclists on the descent, and separation between modes is proposed for user safety and comfort.

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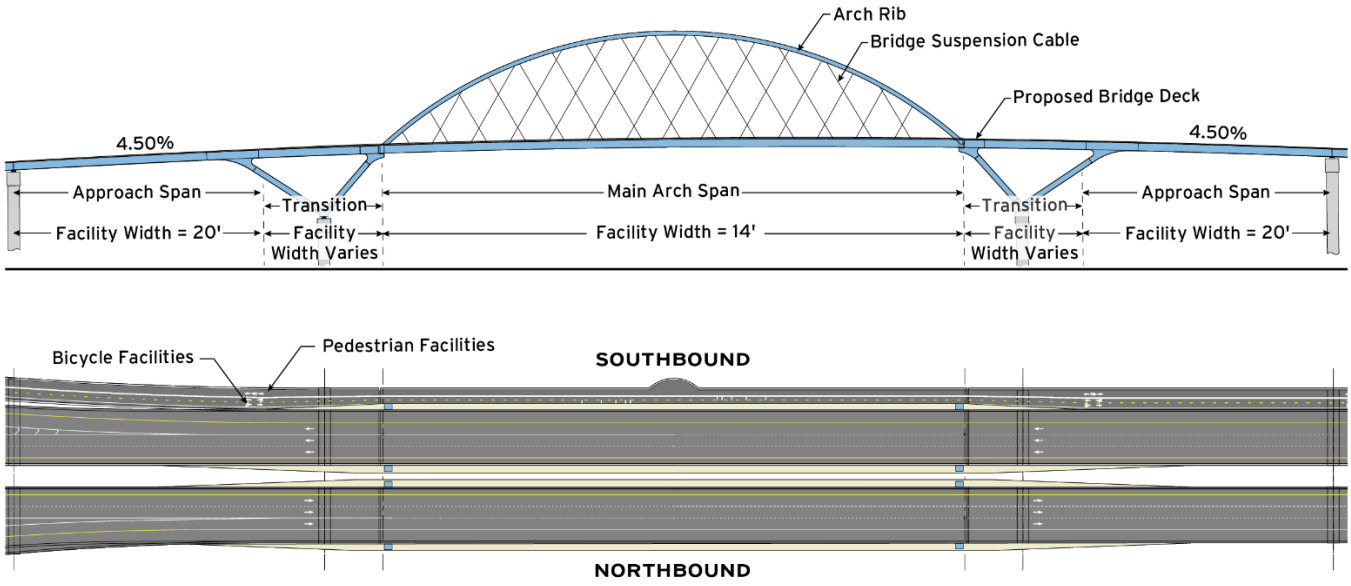
[17] Federal Highway Administration. 2019. Bikeway Selection Guide. February. https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf

[18] The width of the facility from edge of pavement to edge of pavement defines the effective width.

[19] American Association of State Highway and Transportation Officials. 2012. Guide for the Development of Bicycle Facilities (Fourth Edition). https://njdotlocalaidrc.com/perch/resources/aashto-gbf-4-2012-bicycle.pdf

There are two cross-sections over the replacement bridges: at the approach span and at the arch span. **Figure 4.3-10** provides a rendering of the bridge main span and the limits of the bridge approaches, the arch span and suspension cables, and the locations of the arch ribs. The approach cross-section uses the full 20-foot effective width because this is where the greatest speed differential is anticipated between pedestrians and bicyclists. The structure width remains 20 feet at the arch span; however, the effective width of the facility narrows to 14 feet due to the presence of the bridge arch ribs and cables required for suspension. As the arch span signifies the crest of the bridge profile, it is anticipated that bicyclists will be beginning their descent or finishing their climb. Therefore, they will be traveling at lower speeds and not require the additional width needed for the approaches.

Figure 4.3-10. Bridge Main Span and Limits of Approach and Arch Spans (Rendering)



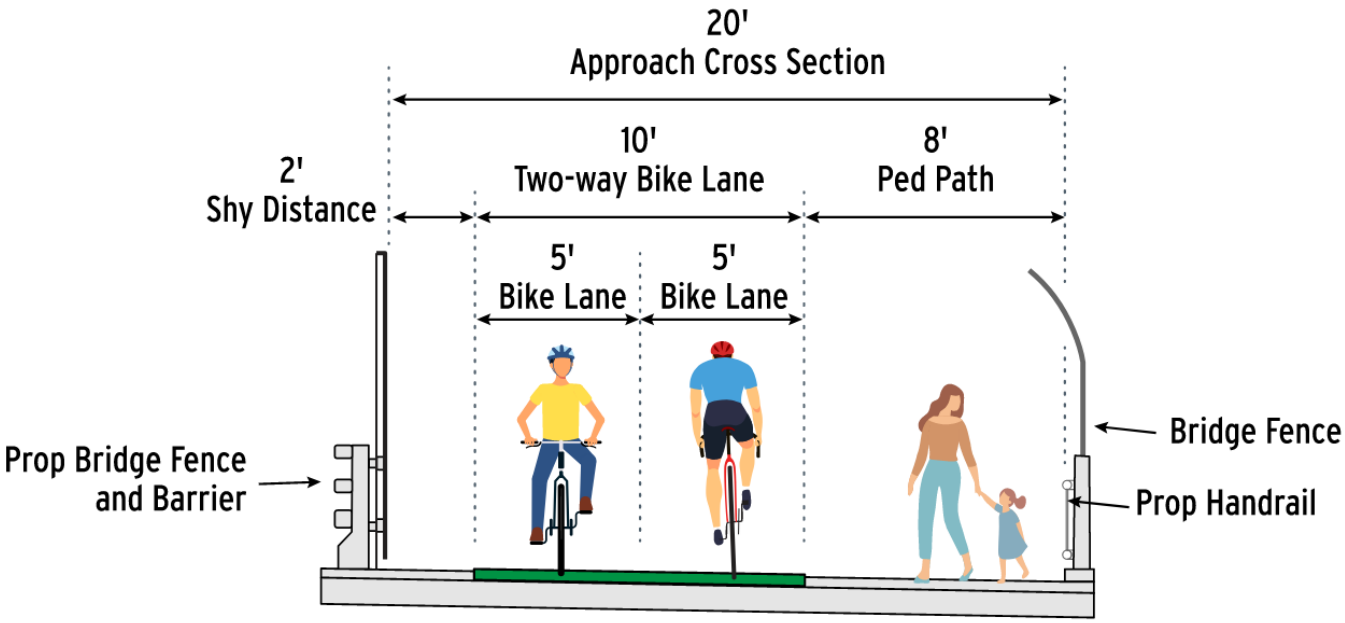
Source: Massachusetts Department of Transportation, 2025

The approach cross-section, using the full effective width of 20 feet, would provide a 10-foot-wide, two-way separated bicycle lane and an 8-foot-wide pedestrian path. The two-way separated bicycle lane would accommodate the recommended width of 5-foot-wide bicycle lanes in each direction and enable passing movements per MassDOT Guidelines.[20] The bicycle facility would be offset 2 feet from the bridge fence and barrier on the vehicle side to accommodate shy distance. The 8-foot-wide pedestrian path would allow for bidirectional travel and the ability to walk in groups. Bridge fence and railing are proposed on the outside edge of the facility to provide pedestrians with unobstructed views of the canal and aid accessibility for the visually and physically impaired. The proposed design would allow pedestrians to stay on the outside edge of the facility with immediate access to the overlook and views of the canal, while bicyclists would remain on the roadway side of the facility to minimize

[20] Massachusetts Department of Transportation. 2015. "Chapter 3, General Design Considerations," Separated Bike Lane Planning & Design Guide. https://www.mass.gov/doc/chapter-3-general-design-considerations/download

conflicts of mixed-use lanes and crossing pedestrian traffic. **Figure 4.3-11** provides a typical cross-section of the approach cross-section.

Figure 4.3-11. Typical Section of Shared-Use Facility at Approach Span (looking southbound)

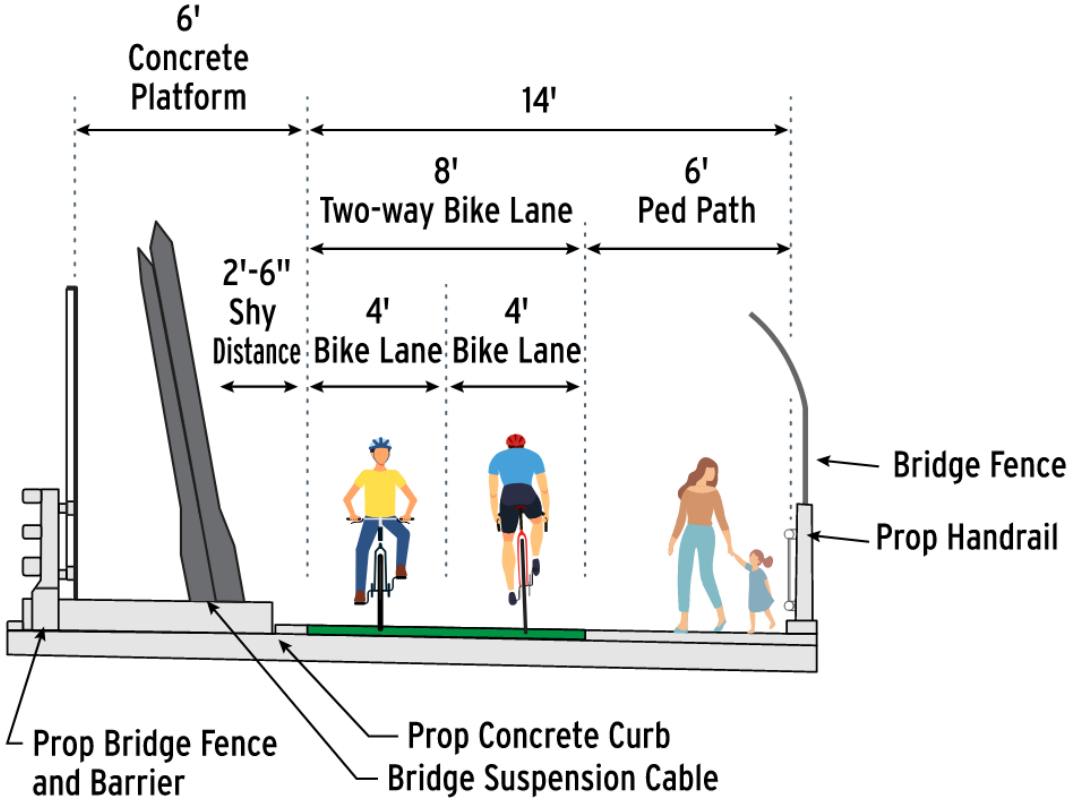


Source: Massachusetts Department of Transportation, 2025

The arch cross-section would narrow its effective width from 20 feet to 14 feet. The alignment of the facilities would remain the same; however, both facilities would be narrowed to meet minimum width requirements and shy distance offsets. The two-way bicycle lane would narrow to 8 feet, which would meet the minimum width for bidirectional bicycle lanes outlined in MassDOT's Guidelines (Chapter 3).[21] Although a 10-foot width is preferred for this type of facility, narrowing the facility to 8 feet within the arch span is required due to the constrained width. This would still allow bidirectional movement but would restrict the ability for passing movements. The arch span is expected to maintain lower speeds than the approaches because bicyclists would be reaching the crest of the bridge profile or just starting their descents. The pedestrian path would narrow to 6 feet wide and would remain on the outside of the facilities to maintain continuity and provide uninterrupted views of the canal over the bridges. The proposed shy distances and offsets to vertical objects and obstructions would meet MassDOT Guidelines (Chapter 11).[22] **Figure 4.3-12** provides a typical cross-section of the approach cross-section. **Figure 4.3-13** provides a rendering of the proposed shared-use facility at the arch span on the replacement bridge.

[21] https://www.mass.gov/doc/chapter-3-general-design-considerations/download
[22] https://www.mass.gov/info-details/pddg-chapter-11-shared-use-paths

Figure 4.3-12. Typical Section of 14-foot-wide Shared-Use Facility on Arch Span (Southbound)



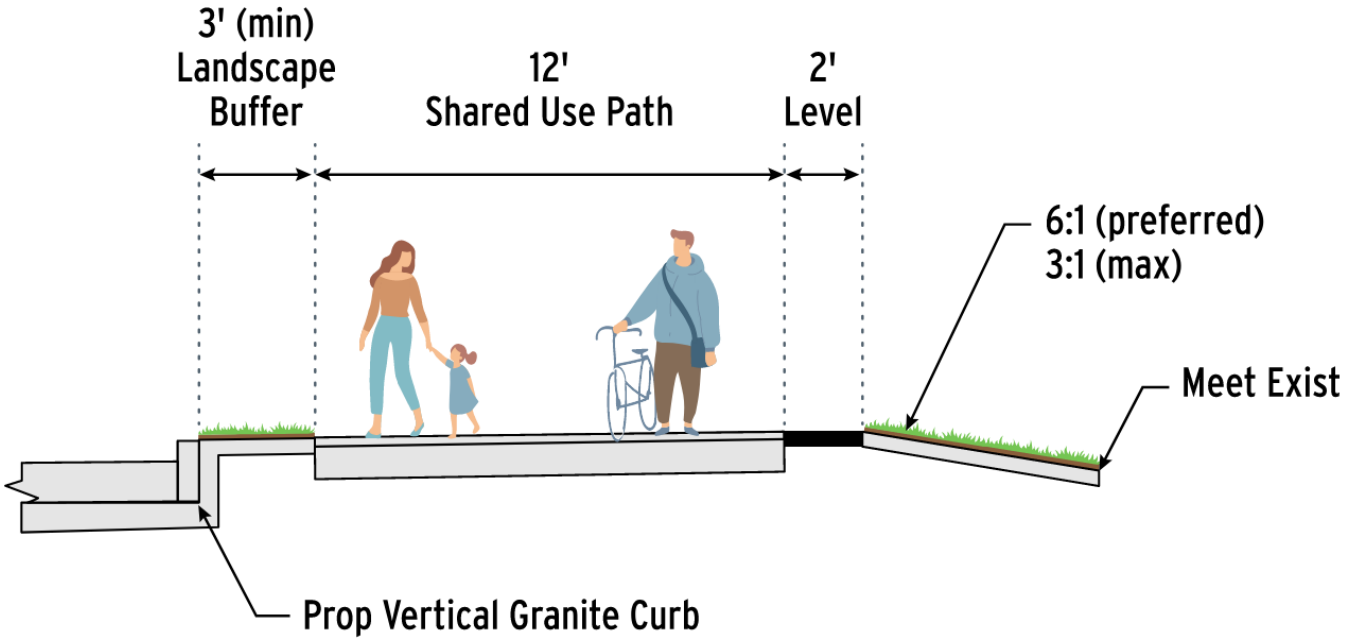
Source: Massachusetts Department of Transportation, 2025

Figure 4.3-13. Shared-Use Facility on Replacement Bridge (Rendering)

Source: Massachusetts Department of Transportation, 2024

The addition of the shared-use facilities along the replacement bridge main spans and interchange approaches would provide connections to local roadways and to the USACE's Canal Service Roads in all four Study Area quadrants (i.e., Sagamore North, Sagamore South, Bourne North, and Bourne South). Off the main spans and the structure, designated space for bicycles and pedestrians would also be accommodated within the typical section for local roadways. Once off the bridge, the local roadway profiles would follow the landscape, and the differential between design speeds for pedestrians and bicyclists would not be significant enough to justify separation of modes. Additionally, the lack of bridge barrier, curbing, and fencing off-structure would allow for the ability to share space without needing to accommodate shy distance for obstructions. The facility off-structure would provide a consistent 12-foot-wide SUP with a minimum 3-foot-wide landscaped buffer on the roadway side and a minimum 2-foot-wide level area on the opposite side. **Figure 4.3-14** provides a typical section of the SUP applied off-structure for the rest of the Project Limits and local roadways.

Figure 4.3-14. Typical Section of 12-foot-wide Shared-Use Path Off-Structure



Source: Massachusetts Department of Transportation, 2025

4.3.4.1 Sagamore North Quadrant

As described in the previous section, a 20-foot-wide shared-use facility would be provided along the eastbound side of U.S. Route 6 on the Sagamore Bridge approach. The 20-foot-wide elevated facility would narrow to a 12-foot-wide SUP along the eastbound on-ramp and the south side of Scenic Highway. The Build Alternative proposes new pedestrian and bicycle connections from Sagamore Bridge to all four quadrants of the interchange. The facility along Scenic Highway would now extend to the Brigantine Passage Drive neighborhood at the western end of the Study Area and Commerce Way, State Road, and Meeting House Lane at the eastern end of the Study Area. There is an existing sidewalk connection from Church Lane at the southbound off-ramp across Scenic Highway. These connections would now allow the residential neighborhoods within the Study Area to have safe and comfortable, separated facilities to access the Sagamore Park and Ride Lot, Bus Depot, and the shared-use Canal Service Road. An additional connection would be provided from the eastbound on-ramp to the shared-use Canal Service Road along the canal. Scenic overlooks, park benches, lighting, trash cans, and other amenities would also be provided along the SUP connection to the shared-use Canal Service Road. **Figure 4.3-15** depicts the conceptual layout of proposed SUP facilities and sidewalks in the Sagamore North quadrant.[23]

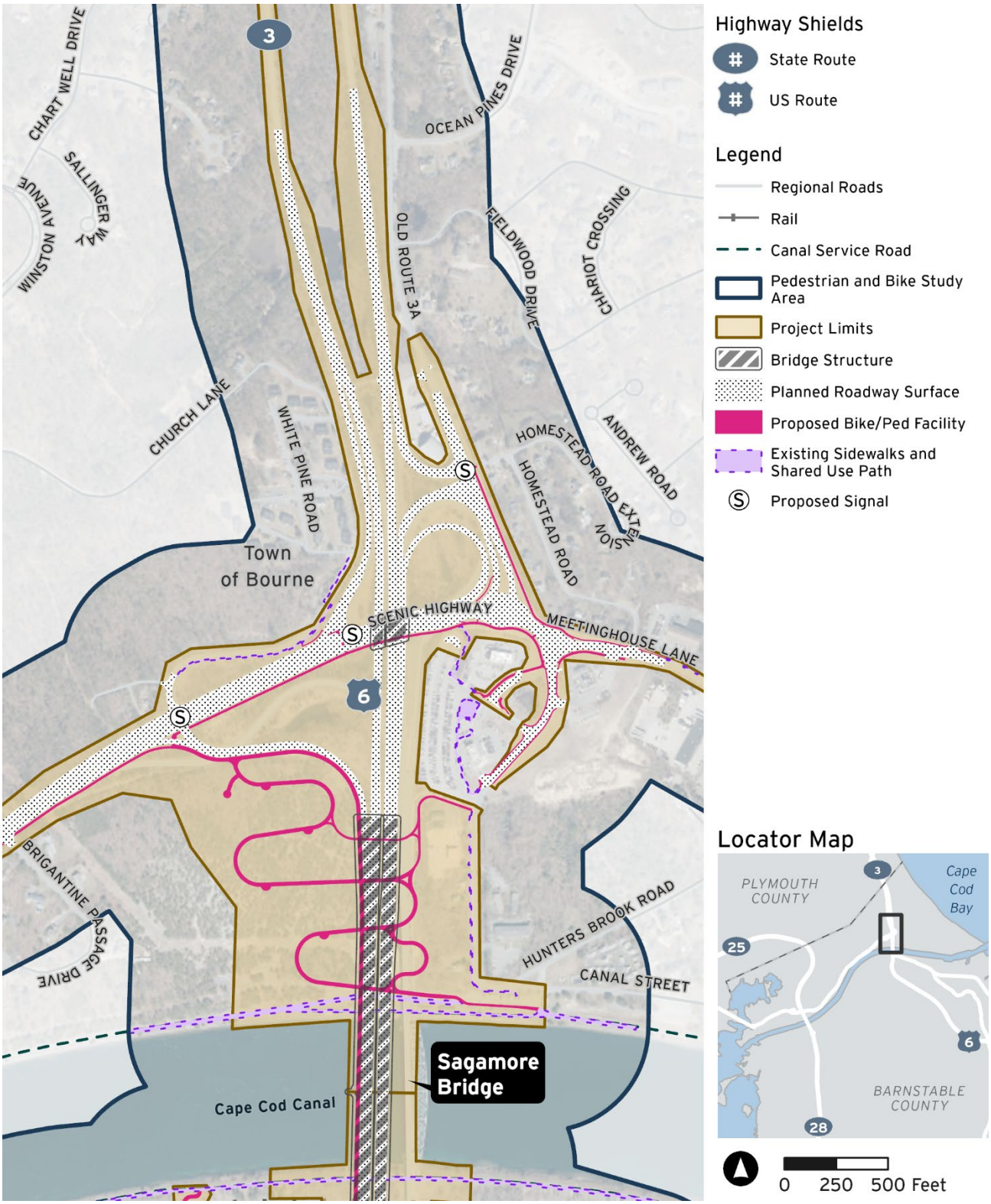
4.3.4.2 Sagamore South Quadrant

A 20-foot-wide shared-use facility would be provided along the eastbound side of U.S. Route 6 on the Sagamore Bridge, which continues along the eastbound off-ramp and Mid-Cape Connector to the intersection of Cranberry Highway. At Cranberry Highway, the shared-use facility would transition to a 12-foot-wide SUP that would extend west to Autumn Way, north to the shared-use Canal Service Road, and east to Adams Street. The SUP at-grade crossing of the Massachusetts Coastal Railroad tracks to the shared-use Canal Service Road would be signalized with flashing warning beacons for public safety. A 12-foot-wide SUP would be provided along the perimeter of the dual roundabouts and would connect to Cranberry Highway and Adams Street. Buffered bicycle lanes and sidewalks would connect the gap between the Mid-Cape Connector and the dual roundabouts and would provide a key connection to Market Basket. **Figure 4.3-16** depicts the conceptual layout of proposed pedestrian and bicycle facilities in the Sagamore South quadrant.[24]

[23] This shared-use path configuration is based on a preliminary design as of August 2024. Any subsequent updates will be included in the Final Environmental Impact Statement.

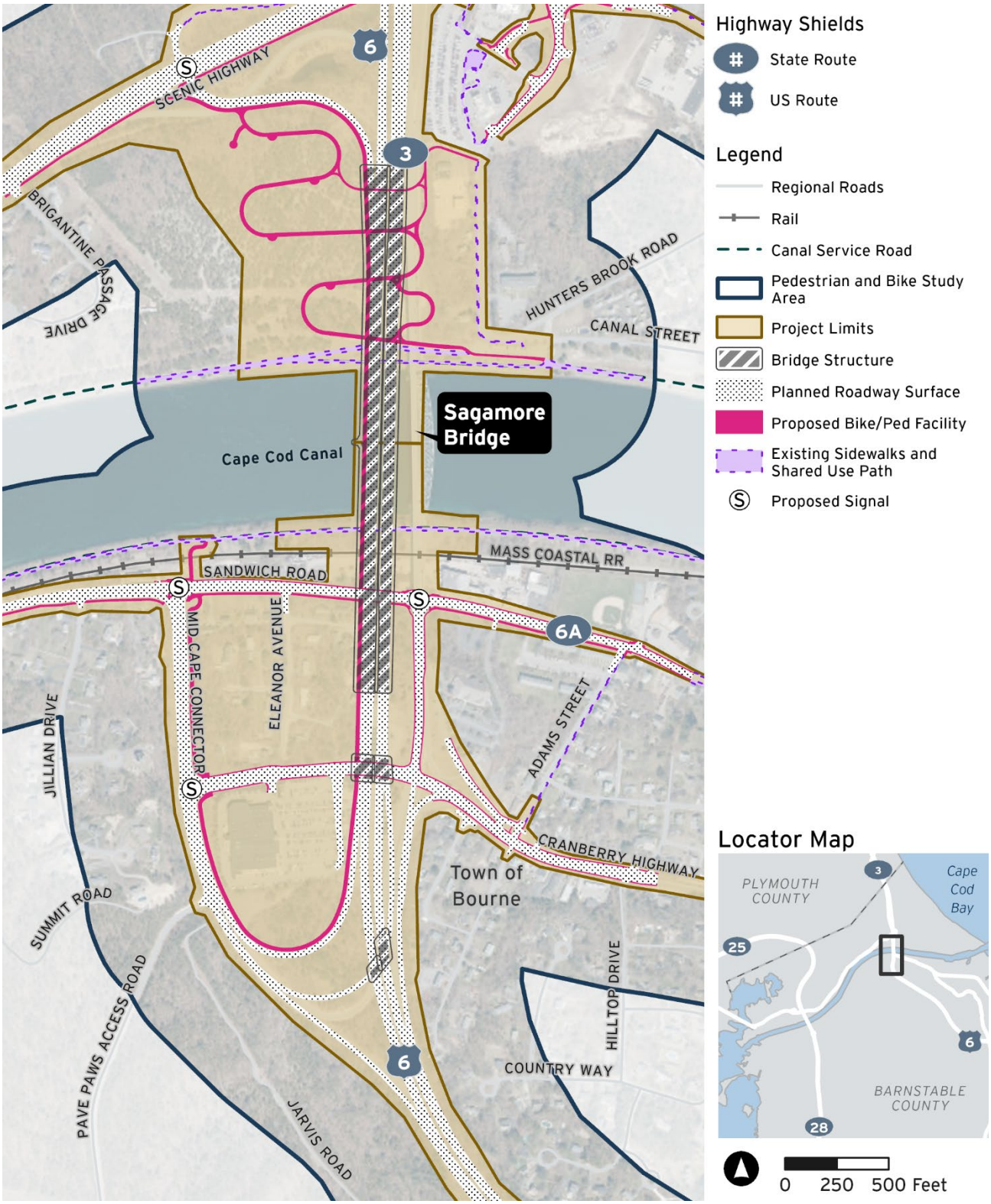
[24] This shared-use path configuration is based on a preliminary design as of August 2024. Any subsequent updates will be included in the Final Environmental Impact Statement.

Figure 4.3-15. Pedestrian and Bicyclist Facilities (Sagamore North Quadrant)



Source: Massachusetts Department of Transportation, 2024

Figure 4.3-16. Pedestrian and Bicycle Facilities (Sagamore South Quadrant)



Source: Massachusetts Department of Transportation, 2024

4.3.4.3 Bourne North Quadrant

A 20-foot-wide shared-use facility would be provided on the approach spans and off-structure along the southbound side of State Route 28 over Bourne Bridge and would continue along the eastbound off-ramp toward Belmont Circle. Once off-structure, the shared-use facility would transition to a 12-foot-wide SUP that would connect Belmont Circle to U.S. Route 6 (Scenic Highway). The SUP would connect to the 12.5-foot-wide SUP constructed along the south side of Scenic Highway from Nightingale Road to Edgehill Road as part of MassDOT Project No. 606082. A SUP connection from U.S. Route 6 to the shared-use Canal Service Road would also be provided to connect the town center of Bourne to the campground and the existing recreational facilities along the canal. A sidewalk and bicycle ramps to shoulder bicycle lanes are proposed connections to the existing facilities on Nightingale Road. **Figure 4.3-17** depicts the conceptual layout of proposed SUPs and sidewalks in the Bourne North quadrant.[25]

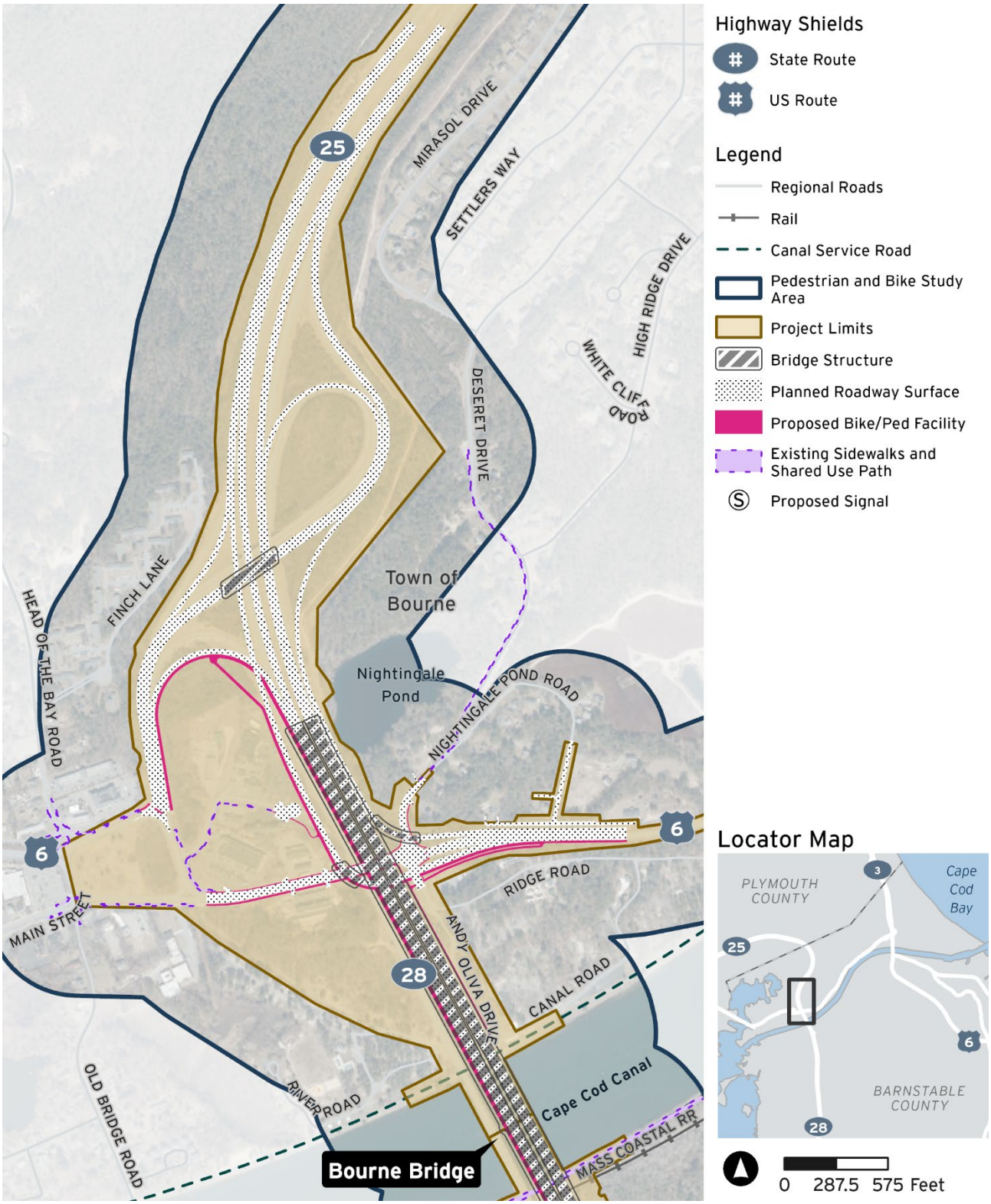
4.3.4.4 Bourne South Quadrant

A 20-foot-wide shared-use facility would be provided along the southbound side of State Route 28 over Bourne Bridge and would continue along the southbound off-ramp toward the District 7 State Police barracks. At this transition from on-structure to off-structure, a mixing zone with wayfinding signs and landscape features would be provided. The shared-use facility would transition to a 12-foot-wide SUP at the mixing zone and would provide desired connections to the Canal Service Road at the northern end of the Project Limits, the Upper Cape Vocational School, and the Gallo Ice Arena at the eastern end of the Project Limits, and Sandy Lane at the western end of the Project Limits. There is a rail crossing at the connection to the Canal Service Road and the existing SUP facilities along the canal. The rail crossing would be signalized with warning beacons. With the proposed design, residents within the Bourne South quadrant would have safe, comfortable, and separated facilities to access the local schools, bus depot, businesses, and recreational facilities. **Figure 4.3-18** depicts the conceptual layout of the proposed shared-use facilities and sidewalks in the Bourne South quadrant.[26]

[25] This shared-use path configuration is based on a preliminary design as of August 2024. Any subsequent updates will be included in the Final Environmental Impact Statement.

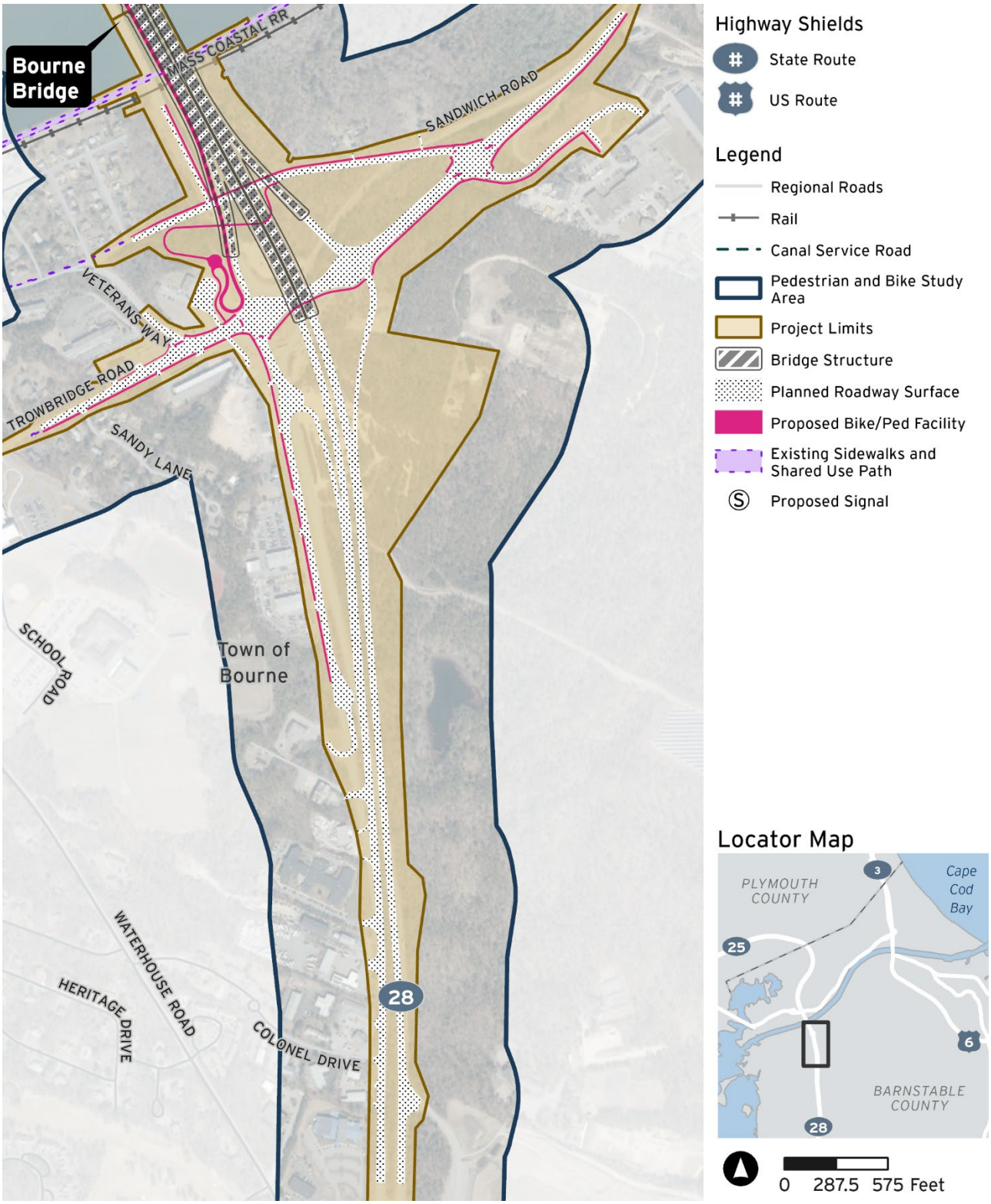
[26] This shared-use path configuration is based on a preliminary design as of August 2024. Any subsequent updates will be included in the Final Environmental Impact Statement.

Figure 4.3-17. Pedestrian and Bicyclist Facilities (Bourne North Quadrant)



Source: Massachusetts Department of Transportation, 2024

Figure 4.3-18. Pedestrian and Bicyclist Facilities (Bourne South Quadrant)



Source: Massachusetts Department of Transportation, 2024

4.3.4.5 Operational Effects

The Build Alternative would provide pedestrians and bicyclists with safe and comfortable connections to schools, jobs, essential services, recreational areas, and other destinations within the Study Areas. The provision of off-road SUPs and facilities would reduce potential conflicts with pedestrians, cyclists, and motorists by providing physically separated travel areas for nonmotorized road users. Connected networks of walking and bicycling infrastructure would provide long-term public health benefits due to increased opportunity for active transportation and improved air quality by reducing reliance on motor vehicles for short trips.

The Build Alternative would improve accommodations, mobility, and accessibility for pedestrians and bicyclists, consistent with the Cape Cod Bridges Program's purpose and need. Proposed SUP connections from the replacement bridges and adjacent roadways to the USACE Canal Service Roads would support bicycle-pedestrian connections to recently completed and future planned regional SUP projects.

The Build Alternative would expand and close gaps in the bicycle and ADA-accessible sidewalk networks, consistent with the goals of the Cape Cod Regional Transportation Plan.[27] These infrastructure improvements would make walking and biking more convenient, comfortable, and safer options for short trips than driving, which are consistent with the goals of MassDOT's Massachusetts Pedestrian Transportation Plan and Bicycle Transportation Plan.[28]

4.3.4.6 Construction-Period Effects

The Build Alternative would provide pedestrian and bicycle facilities that meet or exceed existing conditions throughout the duration of construction. For Sagamore Bridge and Bourne Bridge, existing and temporary connections on each side of the bridges would be used. Crossing the canal via Sagamore Bridge, pedestrian and bicycle accommodations would use the existing bridge during construction of the new southbound bridge. Once the new southbound bridge is constructed, the proposed shared-use facility discussed in **Section 4.3.3** would be open for use (**Figure 4.3-19**). Crossing the canal via Bourne Bridge, pedestrian and bicycle accommodations would use the existing bridge during construction of the new northbound bridge. Once the new northbound bridge is constructed, temporary pedestrian and bicycle facilities would use the new northbound bridge outside shoulder, westbound on-ramp for the Bourne North quadrant and the new northbound on-ramp for the Bourne South quadrant via a barrier separation (**Figure 4.3-20**). Once the new southbound bridge is constructed, the shared-use facility discussed in **Section 4.3.4** would be open for use.

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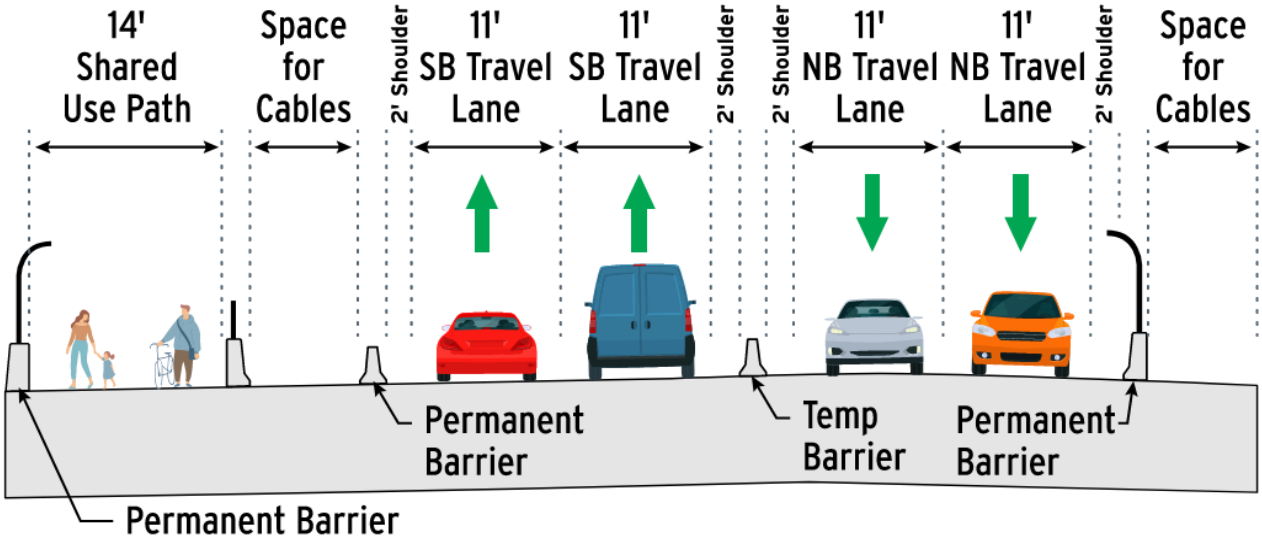
[27] Cape Cod Commission. 2023. Cape Cod 2024 Regional Transportation Plan (2024–2044). July. https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/tr/Transportation%20Plans/RTP/2024_RTP/Report/FINAL%20PDF/Cape%20Cod%202024%20Regional%20Transportation%20Plan_Endorsed%20072420 23.pdf

[28] Massachusetts Department of Transportation. 2019. Massachusetts Pedestrian Transportation Plan. May. https://www.mass.gov/info-details/pedestrian-plan; Massachusetts Bicycle Transportation Plan. May. https://www.mass.gov/info-details/bicycle-plan

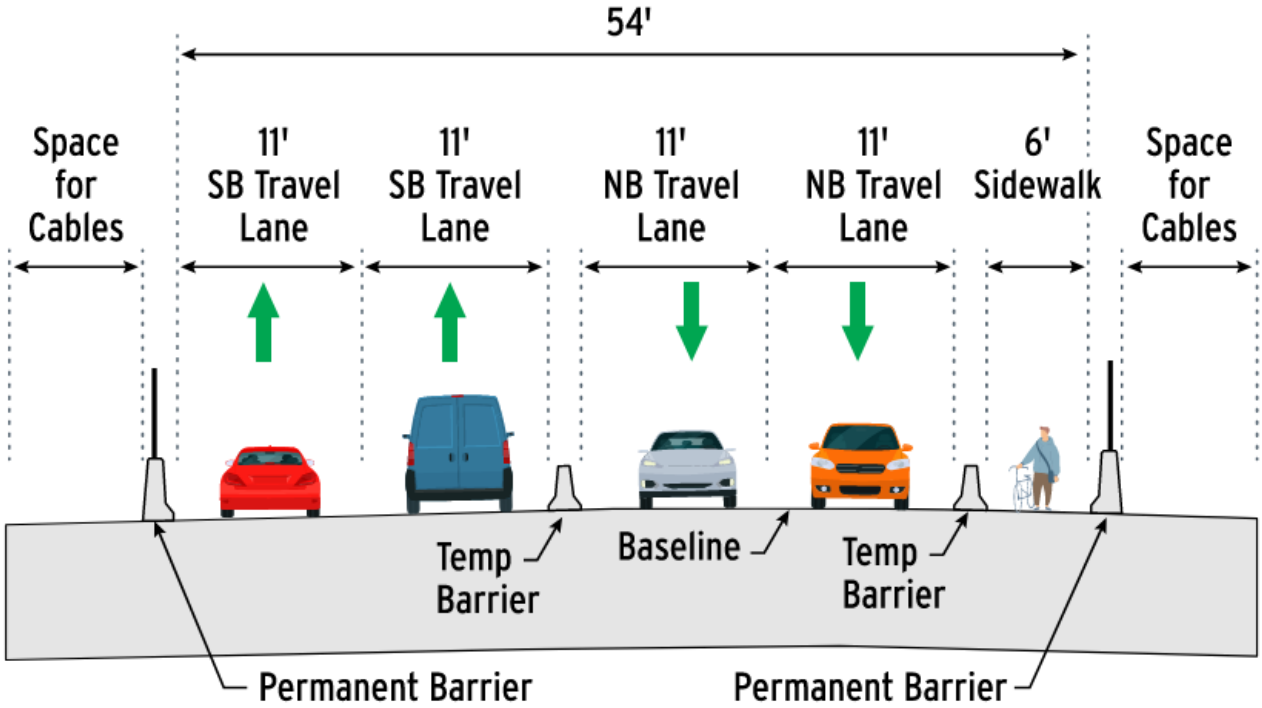
Figure 4.3-19. Temporary Typical Main Span Section (Sagamore Bridge Southbound Crossing, looking north)



Source: Massachusetts Department of Transportation, 2025

NB = northbound, SB = southbound

Figure 4.3-20. Temporary Typical Main Span Section (Bourne Bridge Northbound Crossing, looking north)



Source: Massachusetts Department of Transportation, 2025

NB = northbound, SB = southbound

The Build Alternative would require temporary closures of pedestrian and bicycle facilities that run under the bridge mainline structures, including Scenic Highway, Sandwich Road, and the Canal Service Roads. These temporary closures would be necessary to facilitate bridge construction and demolition activities within the work zones at both crossings. The duration of closures is still to be determined, but closures could be several weeks or maybe as much as seven to eight years, depending on location and proximity to construction of the main span structures. **Section 4.3.5** provides measures to avoid, minimize, and mitigate potential construction-period effects associated with the Build Alternative.

4.3.5 Mitigation

4.3.5.1 Operational Effects

As described in **Section 4.3.4**, the Build Alternative would provide long-term improvements to bicycle and pedestrian facilities within the Study Areas through the construction of shared-use facilities on the new bridge approach and arch spans with connections to new SUPs (off-structure). Therefore, no long-term mitigation measures would be required.

4.3.5.2 Construction-Period Effects

Based on coordination with the USACE, MassDOT will be required to deploy signage warning of service road closure and distance to closure at all official trailheads. Fencing and barricades will be used to prevent pedestrian access into unsafe areas within the construction work zones. The phasing for pedestrian and bicycle connectivity during construction will be sequenced to maintain existing conditions until a time when pedestrian and bicycle traffic can be transferred to the proposed bridge. Appropriate signage will be designated for any required temporary detour routes during construction.